

Australia vs. CA Water Management Policy

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Abstract

California has the most extensive water infrastructure arguably in the world; along with this infrastructure comes an array of governing policies for water within the state. Comparing this to a similarly situated area in Australia, the governing institutions and policies regarding these water regimes are notably different. In this project, we explore the differences in infrastructure and governing policies with respect to water in California and Australia. The methods we will use in this project are researching the policies that govern water in each of these areas. Furthermore, this project attempts to provide recommendations if one policy seems to be more comprehensive and successful than the other.

The results from this project are aligned with our initial hypothesis; the Australian policies governing scarce and extensively allocated water resources are more comprehensive and successful than those of California's water management policies. Australia's policies include climate change aspects, and most important, allocate water based on environmental needs which supersede the other water use categories. The success of Australia's water management is a feasible solution for California. With the research throughout the project, the logical conclusion is for California to follow suit in terms of Australia's water management policy structure. This means California needs to implement more comprehensive and cohesive policies to govern its variable water supply.

Some limitations with the conclusion of this project are as follows: consensus on new water management practices, policy barriers, and psychological limitations. The limitation pertains to gaining a consensus on what, who, and how the new water management practices will pan out in California. This is difficult to gain compromise with the extensive amount of stakeholders involved in California water management. Second, there are policy barriers to actually implementing a new water management structure. Lobbying, iron triangles, and bureaucratic influences all play a major and real influence in determining how policy gets enacted. Lastly, there are psychological ramifications to including comprehensive climate change factors in current water management practices. Most people tend to think that climate change is not an immediate factor that needs to be considered, that there is a great amount of spatial distance between water management practices today and climate change. Overcoming this psychological barrier is essential in enacting policies that take climate change into consideration.

The area of Australia we are comparing to California water policy is specifically the Murray Darling Basin. An image of the basin is as follows:



(PA Pundits International)

Introduction

California's current water management state is highly fragmented. With the onset of climate change, and current/continuing environmental degradation with the current system in place, we have proposed this project to help provide solutions and prevention measures to this water crisis situation. The challenge becomes finding a water policy structure for California which is feasible, effective, and successful at balancing both environmental and societal water demands. Furthermore, as the population within California continues to rise, the demand for the limited amount of available water will continue to increase. This situation, coupled with other external environmental factors, poses a need to enhance urban water conservation and efficiency within California.

The problems of California's current state will most likely lead to an impending water crisis. The motivations for wanting to discuss this topic stem from wanting to help solve this problem, with realistic policy measures and procedures to help manage the current and projected water supply and demand. Additionally, motivation stems from reviewing Australia's current governing policies with regards to water management. Australia has successfully implemented a national policy that is comprehensive, considers climate change, and addresses the needs for environmental water use as well as domestic uses. This impetus of a successful policy regime regarding scarce water resource management is the motivation to help provide policy solutions to California's water management.

Objective

Another reason we chose to focus on Australia is because it evaluates the entire water system. When determining water flow and water policy, Australia's policymakers focus on the amount of water needed to maintain the system's natural flow. They look at the needs of aquatic species, the impacts of climate change and industry, and other such factors that alter the natural flow of the Basin. On the other hand, California fails to take this same approach and weighs industrial, urban, agricultural, and domestic use over environmental needs. As a result, California gives the "leftover" water that is not consumed by other outlets to environmental needs. This significantly decreases the natural flow and forces species to deal with less water. However, by following Australia's water conservation approaches, California would be able to maintain natural water flow rates and balance the needs of all water demands. This will require California to practice better water conservation and water efficiency techniques because industry, urban, agriculture, and domestic use will have to decrease in order to provide more water to the natural environment. By following the Australian water policy governance regime, California would be able to conserve its water supply for both ecological and societal demands, making water management and uses harmoniously intertwined.

Our aim of this project is to assess the differences in water efficiency efforts, water conservation efforts, infrastructure, and policy regimes that govern California and Australia respectively. By analyzing the differences across this array of categories, our main task of this project is to: explain the similarities and differences in each nation's approach to water management, coupled with providing solutions for California's current policy system.

Hypothesis

Throughout this project, we hope to explore and analyze the key similarities and differences between these two regions pertaining to population per capita water use, conservation methods, storage methods, and policies to gain insight into successful strategies that could be utilized in California. We hypothesize that Australia's policy regime regarding water is more successful and comprehensive at managing the variability and demand of their water resources. We proposed that California's fragmented system can look to Australia to solve its water management problems.

Data Sources

Data was obtained from a variety of sources in order to correctly test our hypothesis, accomplish a comprehensive report, and derive a significant conclusion. To address the differences between Australia's and California's water conservation efforts the water policies and programs enacted by each region were compared. Data for Australia's water policies and programs was obtained from the Government of Australia's website. Reference Australia's programs and policies that are specifically used within this report and were obtained from the latter source are the following; National Water Initiative of 2004, Water for the Future of 2007, the Murray-Darling Basin Authority, and the overall commitments made by the Government of Australia. To obtain data for Australia's water use per capita statistics were chosen from Australia's Bureau of Statistics.

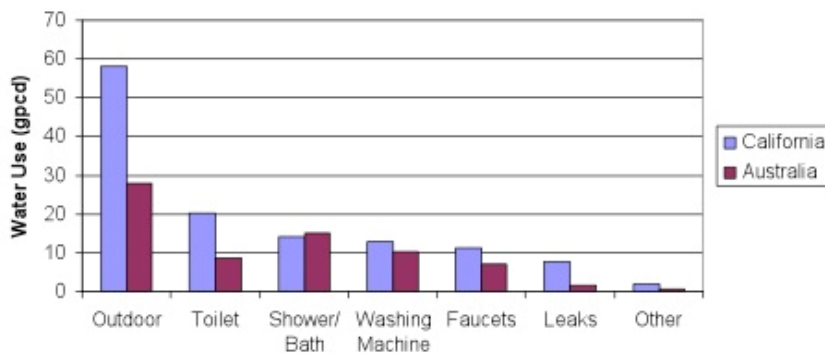
Data for California's water policies, programs, agreements, and accords was obtained from Rivers of Life by Postel et al. This book provided a comprehensive description of the various ways California has dealt with water conservation, and was therefore an appropriate source to derive data from. To address the error's within the framework of California's water conservation efforts qualitative

information was used from the book *Managing California’s Water: From Conflict to Resolution* by Hanak, Lund et al. To formulate these qualitative errors into a quantitative model data was obtained from *Water Resources Systems Planning and Management: An Introduction to Methods, Models, and Applications* by Loucks, Van Beek et al. By combining data from these various sources a comprehensive report and conclusion addressing the hypothesis was achieved.

Methods and Assumptions

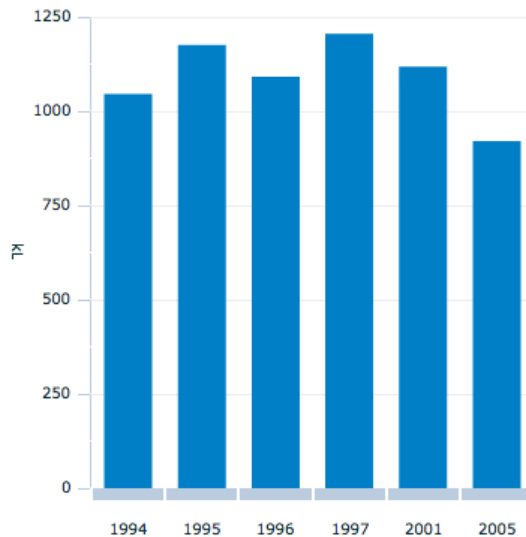
Water Management Category	California	Australia
Population	37.6 Million	22.6 Million
Water Use Per Capita	768 liters	490 liters
Conservation methods	-Low flow water fixtures	-Drip irrigation -Rain water collection programs
Storage methods (infrastructure)	-State Water Project -Central Valley Project -Proposed Peripheral Canal -Delta pumps at Tracey -Colorado river (upstream Parker and Hoover Dams) -Dams: Hetch Hetchy, Klamath, etc. -Concept of “water flows uphill to money in California”	-Collect winter precipitation and store it over the arid seasons -11 dams
Policies	-Clean Water Act -Safe Drinking Water Act -NEPA and CEQA requirements -Colorado River Compact, International agreements with Mexico -Bay-Delta Agencies	-National Water Initiative -Commitments by the government -Water for the Future (2007) -Murray-Darling Basin Authority

Californian and Australian End Uses of Water



The figure at left shows the water use of California compared with the same activities in Australia. The amount used by Californians is higher almost in every activity.

(californiawaterblog.com,



This bar graph at the left exemplifies the decrease in water consumption on a per person basis after the initiation of Australia's 2004 Water Initiative

(abs.gov.au, 2005)

To accurately compare the effects of the conservation approaches that Australia used in order to decrease the water use per capita within the region we analyzed the per capita water usage prior and after to the enactment of Australia's National Water Initiative in 2004. According to the graph above from the Australian Bureau of Water Statistics the 2004-05 water consumption on a per person basis 18% lower than in 2000-01. This is a significant decrease in water usage within a short period of time. This decrease in water consumption due to this initiative is compared to the lack of a comparable initiative within California that could result in comparable statistics. Results of an initiative within California such as Australia's 2004 Water Initiative has the potential to create a significant and similar decrease in California's water use per capita. In addition the comparison of collaboration between the Australian Governments is compared to the fragmented system within California.

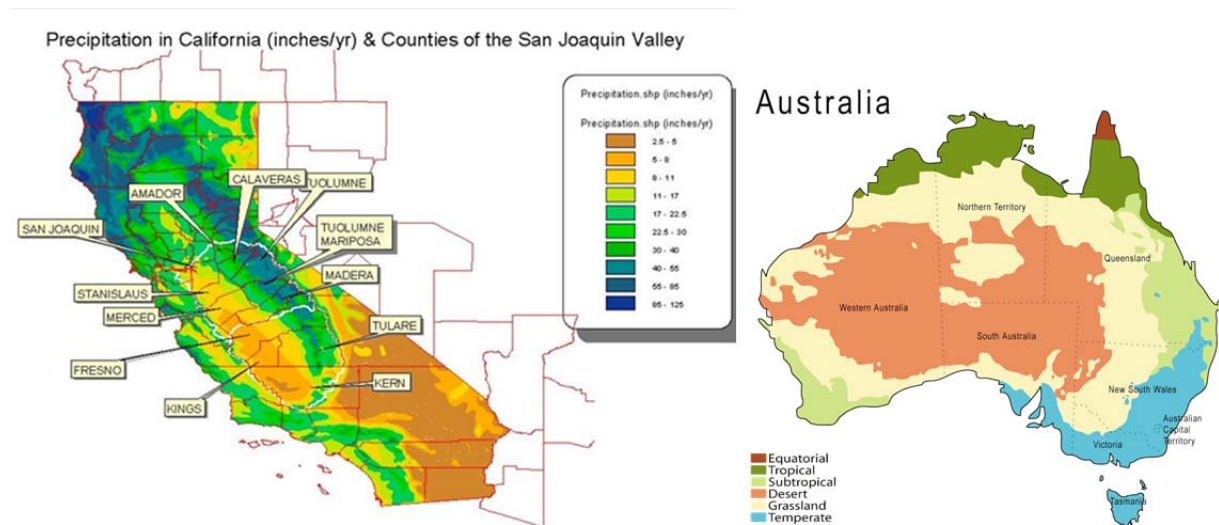
Australia keeps track of their water demands and supplies through four key aspects: daily rainfall, water supply, water storage, and watering days. The information of the amount of water in their 11 dams at any given day, and what water infrastructure projects are in the works, is open for the public's viewing. Ways to be water wise are also posted and need no searching. Depending on your house address number, you are only allowed to water your lawn on odd days or even days; and in between the time of before 9am and after 6pm.

Water Storage

Australia's climate is similar to California's in that rainfall is very seasonal. In fact, it rains even less in Australia than California at only 24 inches annually, as compared to areas in California, which receive 50 – 100 inches a year of precipitation. This calls for great measures in storing water properly and being sure to have a sufficient supply throughout the year. But it is mostly California's water crises we hear about.

To store water for the arid seasons, Australia's National Centre for Groundwater Research and Training calls for "banking its water underground when rainfall is plentiful" in aquifers such as a well-known policy here in California. What is different is researchers in Australia's thoughts to bring about "surface water and groundwater as a single resource – and managing them together, in an integrated way over time". They do not manage each water system separately, but rather integrate it into one, comprehensive water resource (groundwater.com.au, 2012). Many times the concept of "national leadership" is a necessity when implementing something new or proposing ideas. This almost seems impossible in California (let alone the entire US), as politics and environment rarely mix.

On another note, Australian researchers see the similarities with California's climate as well, and state based on observations of water management in the Murray Darling Basin (MDB) and the western USA, that "water banking can provide a big part of the solution to Australia's perpetual boom/bust relationship with water and the climate" (groundwater.com.au, 2012). Looking to water systems with similar situations and successions is important, and California and Australia should in fact compare and contrast water polices and implementations, overlooking the hemispherical distance.



In these maps of precipitation of each area (California vs. Australia) we can see that both have very dry areas and some more temperate areas. The need comes of transporting water from the wetter regions to the desert-like ones.

(romickinoakley.wordpress.com, 2009); (cluster.bom.gov.au, 2011)

Going Beyond Our Water Needs

The United States and Australia both consist of unique ecosystems that worth undisturbing and conserving. With water infrastructures and other natural environmental demands, it is easy to affect (unintentionally) the environment. Australia offers complete ranges of professional services to "deliver the highest standards in ecological restoration and consultancy" (australianecosystems.com.au, 2012).

Much less species are affected by Australia's water projects than our own. Wetlands are not ruined but rather consist of revegetation and away from pollution. California has already once and many more times after that came too close to destroying natural unique habitat. What's been done is done, but in future water implementations and new innovations, perhaps we could peek in on Australia's protection polices and see that irreversible change does not have to be, and should not be, an option.

On the other hand, California has less comprehensive water policy strategies, such as the Clean Water Act, Safe Drinking Act, California Environmental Quality Act (CEQA), and the Bay Delta Accord. The Clean Water Act was implemented in 1972 as an amendment to the Federal Water Pollution Contract Act. The Clean Water Act gives the Environmental Protection Agency (EPA) the authority to set water outflow limits on both an industry-wide basis and on a water-quality basis. It also requires that anyone who wishes to discharge any sort of pollutant first request a permit and go through a screening process. By doing this, the EPA is guaranteeing the protection of distributed water (EPA, 2011). Also, the Safe Drinking Act requires the EPA to set standards for drinking water quality, and it also oversees the every state, the localities, and the water suppliers, to be sure that all groups are complying with the established targets (EPA, 2012). Both these federal policies place restrictions on the quality of both natural and domestic water.

In addition, California as implemented its own policy that is more restrictive, ensuring better water quality. CEQA is California's largest and broadest environmental law. It requires developers to undergo restrictive overview processes and acquire permits before starting on any project. CEQA permitting applies to all discretionary projects and allows the public to be away of all environmental effects attached to such a project. It also prevents or minimizes damage to the environment through the development of project alternatives, mitigation measures, and mitigation monitoring. It also requires developers to re-evaluate their projects if they do not follow the area's environmental standards. In addition, it encourages interagency coordination through consultations, meetings, and notices of preparation (Department of Fish and Game). Lastly, California created the Bay-Delta Accord that replaced the CALFED governance institution that oversaw the California San Joaquin River Delta. The Bay-Delta Accord is a long term planning process that is intended to improve the quality and efficiency of the Delta region. It allows all regions of California to discuss their needs and collaborate together (CALFED, 2007). Both these state polices, allows California to preserve their various water policies; however, in comparison to Australia, they do not create specific water conservation programs. Rather, they are more overall generalizations that offer developers guidelines.

Results

As a result, if California were to focus on similar key elements it would significantly decrease its water use per capita. For example, California can take advantage of its rain during wet months to increase its water storage, which could then be used during the dry conditions. In addition policymakers can follow Australia's surface and ground water integrated system to create a more inclusive water network. This ensures that both systems are in constant balance while complementing each other, rather than working in competition. Also, California can take further advantage of its rain by creating a water bank, as seen in Australia. A water bank keeps aquifers balanced and thus provides a more stable water supply throughout the year. In addition, by using rainfall more effectively, California can prevent

excess runoff and increase the amount of water going into the system. Also, California needs to not only focus on the water needs of society, but also make the needs of the ecosystem a key focal point. Australia has developed policies that account for the natural flow, habitats, and demands of their water system; however, California simply considers a water system's needs, rather than making them a key factor within their policies. Although California does have some overheard standards and regulations, they are too broad and mainly generalizations. Instead, California needs to create specific water policies for each individual project. Australia's water policy initiatives demonstrate its commitment to the environment by working around the environment by protecting it and guaranteeing its future existence.

Conclusion

Our conclusion supports our hypothesis that Australia portrays a better water-policy system than California because it's able to manage and balance the different water systems. We found that Australia, through its comprehensive strategies and initiatives, is able to balance both ecosystem and society demands, without compromising the system's natural water supply.

According to the found results the hypothesis that Australia's policy regime regarding water is more successful and comprehensive at managing the variability and demand of their water resources in comparison to California's is correct. Our main finding, that water use per capita given the population within Australia is significantly lower due to Australia's comprehensive conservation in comparison to California's fragmented system, is important in that it acknowledges the differences in water usage due to varying conservation efforts between the regions. This finding supports the argument that Australia's approach to water management is superior to that of California's and should be a model that should be replicated within California's political framework of water conservation. Although California has made many efforts to deal with the high water demand, given its natural limited supply of water, its efforts are too fragmented to achieve a level of conservation that is seen within Australia. The comprehensive water management efforts within Australia which combine the water demand for economic purposes and ecological purposes while accounting for the effects of climate change create a significantly lower level of water usage per capita.

Recommendations/Limitations

Throughout this project we have examined Australia's comprehensive and enforceable policies with regards to water management. Some key recommendations we propose to California is to follow Australia's pathway of comprehensive, preventative water policies. Solving the fragmentation and pitfalls of California's water policies can be done by managing the variability of the water source, implementing policies that mimic the natural water regime, and including climate change throughout planning measures. Adaptive management strategies would be best suitable for understanding and altering water policies when needed throughout the state.

Overcoming the policy hurdles, as well as the funding, for strategies that are in the best interest of California will be a main challenge to overcome. Additionally, it is difficult to know what climate change scenario is going to influence localized level water supply. Managing and adapting water infrastructure in both regions are potential problems to overcome. There is also the concern over psychological factors with regards to climate change. With regards to safeguarding against climate change, there is a psychological phenomenon that tends to discount effects such as climate change,

which decreases the relevance or immediacy to put in policy measures to protect against these impending effects. Therefore, this causes many people to implement short-term policies that do not look at solving the long term problems.

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